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ABSTRACT

This document, which reflects Mississippi's statutory requirement that instructional programs be based on core curricula and performance-based assessment, contains outlines of the instructional units required in local instructional management plans and daily lesson plans for the introduction to agriscience program. Presented first are a program description and course outlines. Section I contains a curriculum framework, and section II contains outlines of the instructional units required. The following units are included: introduction to agriscience, introduction to agriscience lab and safety, introduction to the scientific method, human relations/leadership in agriscience, Supervised Agricultural Experience (SAE) in agriscience, basic agricultural information systems, basic principles of animal science, mechanical technology in agriscience, principles of food and fiber science, principles of plant science, principles of soil science, principles of entomology, introduction to biotechnology, and opportunities in agriscience. Each unit includes suggested time on tasks, competencies and objectives, teaching strategies, assessment strategies, and resources. Recommended tools and equipment are listed in section III. Appended are lists of related academic topics and workplace skills for the 21st century and student competency profile. (YLB)

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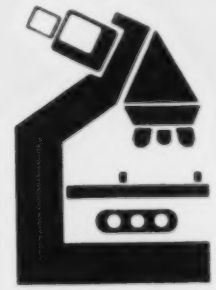
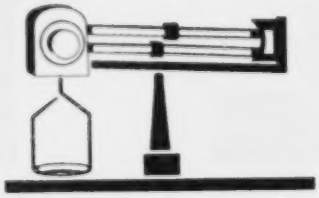
ED 397 277

# Mississippi Curriculum Framework for Introduction To Agriscience





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CE 072 162

*Secondary*
*Vocational and Technical Education*
*1995*

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August 1, 1995

# MISSISSIPPI

# CURRICULUM FRAMEWORK

# FOR

# INTRODUCTION TO AGRISCIENCE

# (PROGRAM CIP: 02.9990 - INTRODUCTION TO AGRICULTURE SCIENCE)

SECONDARY PROGRAMS 1995

August 1, 1995

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# FOREWORD

The courses in this document reflect the following statutory requirements as found in Section 37-3-49, Mississippi Code of 1972, as amended:

> The State Department of Education shall provide an instructional program and establish guidelines and procedures for managing such programs in the public schools as part of the State Program of Educational Accountability and Assessment of Performance. . .
>
> The department shall provide that such program or guidelines . . . are enforced through the performance-based accreditation system.
>
> The local school board must adopt the objectives that will form the core curriculum that will be systematically delivered throughout the district.
>
> Standards for student performance must be established for each core objective in the local program and those standards establish the district's definition of mastery for each objective.
>
> There shall be an annual review of student performance in the instructional program against locally established standards.

Each secondary vocational-technical course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Unit Number and Title
- Suggested Time on Task - The number of days of instruction that should be required to teach the competencies and objectives of the unit. For secondary occupational programs, a "day" represents a two-period block of instruction.
- Competencies and Suggested Objectives
  - A **Competency** represents a general concept of performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies in the curriculum framework.
  - The **Suggested Objectives** represent the enabling and supporting knowledge and performances that will indicate mastery of the competency.
- Suggested Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each suggested objective. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.

- Suggested Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include classroom discussions, laboratory exercises, and student assignments. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources.
- Suggested Resources - This section indicates some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

The following guidelines were used in developing the curriculum framework in this document and should be considered in developing local instructional management plans and daily lesson plans:

- The content of the courses in this document reflects approximately 75 percent of the time allocated to each course. For a one-year course, this means that the content of the existing units of instruction should represent approximately 135 days of instruction. The remaining 25 percent of each course should be developed at the local district level and may reflect:
  - Additional units of instruction within the course related to topics not found in the state framework.
  - Activities which develop a higher level of mastery on the existing competencies and suggested objectives.
  - Activities and instruction related to new technologies and concepts that were not prevalent at the time the current framework was developed/revised.
  - Activities which implement components of the Mississippi Tech Prep Initiative, including integration of academic and vocational-technical skills and coursework, school-to-work transition activities, and articulation of secondary and postsecondary vocational-technical programs.
  - Individualized learning activities, including work site learning activities, to better prepare individuals in the courses for their chosen occupational area.

- Sequencing of the units of instruction within a course is left to the discretion of the local district. Naturally, foundation units related to topics such as safety, tool and equipment usage, and other fundamental skills should be taught first. Other units related to specific skill areas in the course, however, may be sequenced to take advantage of seasonal and climatic conditions, resources located outside of the school, and other factors.

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August 1, 1995

# PROGRAM DESCRIPTION

## INTRODUCTION TO AGRISCIENCE

(Program CIP: 02.9990 - Introduction to Agriculture Science)

Introduction to Agriscience serves as an introduction to the science of agriculture and will provide a solid foundation for advanced agriscience classes or for additional agriculture/science classes.

August 1, 1995

# COURSE OUTLINE

## INTRODUCTION TO AGRISCIENCE

| Unit No. | Unit Title | No. of Days |
|---|---|---|
| Unit 1 | Introduction to Agriscience | 5 |
| Unit 2 | Introduction to Agriscience Lab and Safety | 5 |
| Unit 3 | Introduction to the Scientific Method | 5 |
| Unit 4 | Human Relations/Leadership in Agriscience | 5 |
| Unit 5 | Supervised Agricultural Experience (SAE) in Agriscience | 10 |
| Unit 6 | Basic Agricultural Information Systems | 10 |
| Unit 7 | Basic Principles of Animal Science | 13 |
| Unit 8 | Mechanical Technology in Agriscience | 15 |
| Unit 9 | Principles of Food and Fiber Science | 10 |
| Unit 10 | Principles of Plant Science | 13 |
| Unit 11 | Principles of Soil Science | 14 |
| Unit 12 | Principles of Entomology | 10 |
| Unit 13 | Introduction to Biotechnology | 10 |
| Unit 14 | Opportunities in Agriscience | 10 |

# SECTION I:

# CURRICULUM FRAMEWORK

# FOR

# INTRODUCTION TO AGRISCIENCE

CURRICULUM FRAMEWORK

**Course Name:** Introduction to Agriscience

**Course CIP Code:** 02.9990

**Course Description:** Introduction to Agriscience is the entry level course of the secondary Agriscience program. Students in Introduction to Agriscience will gain foundation competencies related to introduction to agriscience, introduction to agriscience lab and safety, introduction to the scientific method, human relations/leadership/FFA activities, supervised agricultural experience (SAE) in agriscience, basic agricultural information systems, Basic principles of animal science, mechanical technology in agriscience, principles of food and fiber science, principles of plant science, principles of soil science, principles of entomology, introduction to biotechnology, and opportunities in agriscience. (1-1½ Carnegie units, depending upon time spent in the course)

**Competencies and Suggested Objectives:**

1. Define terms associated with agriculture, science, and agriscience.
   a. Describe agriculture.
   b. Describe science.
   c. Describe agriscience.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
2. Explain major sciences supporting agriscience.
   a. Describe biology.
   b. Describe chemistry.
   c. Describe biochemistry.
   d. Describe entomology.
   e. Describe horticulture.
   f. Describe agricultural economics.
   f. Describe aquaculture.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
3. Explain current trends occurring in agriscience.
   a. Describe gene transfer.
   b. Describe biotechnology.

c. Describe tissue culture.
d. Describe genetic engineering.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP6*

4. Describe the basic rules of safety in the agriscience laboratory.
   a. Use chemicals safely.
   b. Use heat and fire safely.
   c. Use laboratory equipment safely.
   d. Work safely with specimens/animals.
   e. Use the electrical equipment.
   f. Report an accident.

   *Related Academic Topics (See Appendix A):*

   *C1, C2, C3, C4*

   *Workplace Skills (See Appendix B):*

   *WP1, WP2, WP4, WP5, WP6*

5. Identify all safety equipment in the agriscience laboratory.
   a. Demonstrate use of all safety equipment in the agriscience laboratory.

   *Related Academic Topics (See Appendix A):*

   *C1, C2, C3, C4*

   *Workplace Skills (See Appendix B):*

   *WP1, WP2, WP4, WP5, WP6*

6. Practice safety concepts in laboratory activities.
   a. Demonstrate electrical safety.
   b. Demonstrate hand safety.
   c. Demonstrate poison safety.
   d. Demonstrate eye safety.
   e. Demonstrate fire safety.
   f. Demonstrate gas precautions.
   g. Demonstrate animal safety.
   h. Demonstrate clothing protection.
   i. Demonstrate plant safety.
   j. Demonstrate prevention of explosion danger.

   *Related Academic Topics (See Appendix A):*

   *C1, C2, C3, C4*

   *Workplace Skills (See Appendix B):*

   *WP1, WP2, WP4, WP5, WP6*

7. Identify the terms associated with the scientific method.
   a. Define the terms associated with the scientific method.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

8. Describe each step of the scientific method.
   a. Identify the problem.
   b. Gather data.
   c. Formulate possible solutions.
   d. Implement the preferred solutions.
   e. Evaluate the results.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*
   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*

9. Apply the scientific method.
   a. Identify the problem or question to be answered.
   b. Gather data related to the problem or question.
   c. Formulate possible solutions.
   d. Implement one or a combination of several solutions.
   e. Evaluate the results and pursue further research as needed.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*
   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*

10. Define the terms related to human relations and leadership.
    a. Describe human relations.
    b. Describe leadership.

    *Related Academic Topics (See Appendix A):*
    *C1, C2, C3, C4, C5*
    *S8*
    *Workplace Skills (See Appendix B):*
    *WP1, WP2, WP4, WP6*

11. Explain acceptable manners in appropriate places.
    a. Demonstrate greeting of a guest.
    b. Demonstrate introductions.
    c. Demonstrate table manners.
    d. Demonstrate telephone manners.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*

*S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP6*

12. Explain traits of a good leader.
    a. Describe traits of a good leader including integrity, knowledge, courage, tactfulness, enthusiasm, unselfishness, and loyalty.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*

*S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP6*

13. Describe the role of FFA in developing leadership.
    a. Participate in FFA activities.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*

*S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP6*

14. Participate in parliamentary procedure.
    a. Define parliamentary terms.
    b. Introduce a motion.
    c. Debate amendments.
    d. Utilize different methods of voting.
    e. Discuss taps of the gavel.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*

*S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP6*

15. Explain opportunities for leadership development through the FFA.
    a. Describe contests and awards programs.
    b. Participate in personal development seminars.
    c. Participate in leadership activities and/or leadership conferences and conventions.
    d. Describe national and international exchange programs.
    e. Plan for education experience with industry.
    f. Determine opportunities for participation in personal and community development programs.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

16. Describe the purposes and requirements of the SAE.
    a. Establish objectives for the SAE.
    b. Determine the availability of time and money to invest.
    c. Select a system of record keeping.
    d. Determine benefits of participation in an SAE.
    e. Determine types of SAE programs.

    *Related Academic Topics (See Appendix A):*
    *C1, C2, C4, C5, C6*
    *Workplace Skills (See Appendix B):*
    *WP1, WP2, WP4, WP6*
17. Develop a long-range personal plan for the SAE.
    a. Set long-range goals.

    *Related Academic Topics (See Appendix A):*
    *C1, C2, C4, C5, C6*
    *Workplace Skills (See Appendix B):*
    *WP1, WP2, WP4, WP6*
18. Develop a short-range personal plan.
    a. Set short-range goals.

    *Related Academic Topics (See Appendix A):*
    *C1, C2, C4, C5, C6*
    *Workplace Skills (See Appendix B):*
    *WP1, WP2, WP4, WP6*
19. Complete a training agreement for an SAE.
    a. Establish requirements of student, parents, supervisor, and/or employer.

    *Related Academic Topics (See Appendix A):*
    *C1, C2, C4, C5, C6*
    *Workplace Skills (See Appendix B):*
    *WP1, WP2, WP4, WP6*
20. Describe agricultural record keeping for an SAE.
    a. Determine which records to keep and how to maintain each system.

    *Related Academic Topics (See Appendix A):*
    *C1, C2, C4, C5, C6*
    *Workplace Skills (See Appendix B):*
    *WP1, WP2, WP4, WP6*
21. Maintain agricultural records for an SAE.
    a. Prepare income and expense records.
    b. Prepare inventory records.
    c. Compute enterprise summaries.
    d. Maintain placement records.

e. Summarize the SAE program.
f. Maintain leadership activity records.
g. Compute a net worth statement.

*Related Academic Topics (See Appendix A):*
*C1, C2, C4, C5, C6*

*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

22. Identify agricultural information systems.
    a. Define terms associated with agricultural information systems.
    b. Identify agricultural information systems including Internet, World Wide Web, Cyberspace, Agricultural Satellite Information System (ASIS), Agricultural Extension Service, and CD-ROM.

*Related Academic Topics (See Appendix A):*
*C1, C2, C4, C5, C6*

*Workplace Skills (See Appendix B):*
*WP2, WP3, WP4, WP5, WP6*

23. Use computer applications in agriscience.
    a. Prepare reports.
    b. Manage records.

*Related Academic Topics (See Appendix A):*
*C1, C2, C4, C5, C6*

*Workplace Skills (See Appendix B):*
*WP2, WP3, WP4, WP5, WP6*

24. Communicate using computerized communications.
    a. Send and receive e-mail.
    b. Transfer files.
    c. Log in to remote computer.

*Related Academic Topics (See Appendix A):*
*C1, C2, C4, C5, C6*

*Workplace Skills (See Appendix B):*
*WP2, WP3, WP4, WP5, WP6*

25. Access information available through the ASIS.
    a. Navigate through the system using indexes and system guides.
    b. Retrieve information regarding regulations, educational programming, and weather data.

*Related Academic Topics (See Appendix A):*
*C1, C2, C4, C5, C6*

*Workplace Skills (See Appendix B):*
*WP2, WP3, WP4, WP5, WP6*

26. Access the World Wide Web.
    a. Configure a browser.
    b. Locate an agricultural company home page.
    c. Conduct information searches.

*Related Academic Topics (See Appendix A):*
*C1, C2, C4, C5, C6*
*Workplace Skills (See Appendix B):*
*WP2, WP3, WP4, WP5, WP6*

27. Identify terms associated with animal science.
    a. Define terms associated with animal science.
    *Related Academic Topics (See Appendix A):*
    *C1, C2, C3, C4, C5*
    *S1, S8*
    *Workplace Skills (See Appendix B):*
    *WP2, WP4, WP6*
28. Identify major species of economically important animals.
    a. Describe the economic impact of cattle, sheep, dairy, swine, poultry, and horses.
    *Related Academic Topics (See Appendix A):*
    *C1, C2, C3, C4, C5*
    *S1, S8*
    *Workplace Skills (See Appendix B):*
    *WP2, WP4, WP6*
29. Identify two major products or uses of each species.
    a. Describe major products or uses of cattle, sheep, dairy, swine, poultry, and horses.
    *Related Academic Topics (See Appendix A):*
    *C1, C2, C3, C4, C5*
    *S1, S8*
    *Workplace Skills (See Appendix B):*
    *WP2, WP4, WP6*
30. Identify the body parts of each species.
    a. Describe the body parts of beef cattle, sheep, dairy cattle, swine, poultry, and horses.
    *Related Academic Topics (See Appendix A):*
    *C1, C2, C3, C4, C5*
    *S1, S8*
    *Workplace Skills (See Appendix B):*
    *WP2, WP4, WP6*
31. Identify the wholesale cuts of each species of meat animal.
    a. Describe the wholesale cuts of beef cattle, sheep, swine, and poultry.
    *Related Academic Topics (See Appendix A):*
    *C1, C2, C3, C4, C5*
    *M1, M7*
    *S1, S8*
    *Workplace Skills (See Appendix B):*
    *WP2, WP4, WP6*

32. Identify terms associated with mechanical technology in agriscience.
    a. Define terms associated with mechanical technology in agriscience.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

33. Explain the structure of matter.
    a. Describe protons.
    b. Describe electrons.
    c. Describe neutrons.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

34. Explain properties of matter.
    a. Describe mass.
    b. Describe weight.
    c. Describe volume.
    d. Describe specific gravity.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

35. Use precision measuring devices to determine mass, weight, and volume.
    a. Demonstrate use of balance.
    b. Demonstrate use of scale.
    c. Demonstrate use of graduated cylinder.
    d. Demonstrate use standard measuring devices including rulers, tape measures, micrometers, dividers, and protractors.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

36. Identify the physical properties of specific materials.
    a. Describe the physical properties of water.
    b. Describe the physical properties of oil.

c. Describe the physical properties of air.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

37. Identify and calculate mechanical advantages of simple machines including lever, inclined plane, wheel, fulcrum, pulley, and axle.
    a. Describe six simple machines including lever, inclined plane, wheel, fulcrum, pulley, and axle.
    b. Calculate mechanical advantages of simple machines including level, inclined place, wheel, fulcrum, pulley, and axle.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

38. Explain the principle of mechanical advantage by using simple machines.
    a. Demonstrate an example of mechanical advantage by using simple machines.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

39. Explain the differences between alternating current (AC) and direct current (DC).
    a. Describe the differences between alternating current (AC) and direct current (DC).

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

40. Demonstrate principles of a simple circuit.
    a. Construct a simple electrical circuit.
    b. Describe the flow of electrons in the circuit.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

41. Explain the characteristics of insulators and conductors.
    a. Describe the characteristics of rubber, plastic, and ceramic insulators.
    b. Describe the characteristics of copper and aluminum conductors.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

42. Explain the principles of series and parallel circuits.
    a. Construct and describe the characteristics of a series circuit.
    b. Construct and describe the characteristics of a parallel circuit.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

43. Explain the economic scope of major areas of the food industry.
    a. Define terms associated with food and fiber science including producer, harvester, processor, distributor, wholesaler, retailer, and consumer.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M7*
*S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP6*

44. Explain career opportunities that occur in the food industry.
    a. Describe career opportunities in business.
    b. Describe career opportunities in processing.
    c. Describe career opportunities in communications.
    d. Describe career opportunities in research and development.
    e. Describe career opportunities in quality assurance.
    f. Describe career opportunities in transportation.
    g. Describe career opportunities in education.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*

*M7*

*S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP6*

45. Explain functions of basic elements of nutrients for humans.
    a. Describe the function of carbohydrates in humans.
    b. Describe the function of fats in humans.
    c. Describe the function of proteins in humans.
    d. Describe the function of vitamins in humans.
    e. Describe the function of minerals in humans.
    f. Describe the function of water in humans.

    *Related Academic Topics (See Appendix A):*

    *C1, C2, C3, C4, C5*

    *M7*

    *S8*

    *Workplace Skills (See Appendix B):*

    *WP1, WP2, WP4, WP6*

46. Explain the process for slaughtering animals for food.
    a. Describe humane killing procedures.
    b. Describe sanitary procedures for removal of skin/hair and evisceration.
    c. Describe procedures for preparation of carcasses into cuts of meat.

    *Related Academic Topics (See Appendix A):*

    *C1, C2, C3, C4, C5*

    *M7*

    *S8*

    *Workplace Skills (See Appendix B):*

    *WP1, WP2, WP4, WP6*

47. Explain methods of processing, preserving, and storing foods.
    a. Demonstrate methods of processing, preserving, and storing foods.

    *Related Academic Topics (See Appendix A):*

    *C1, C2, C3, C4, C5*

    *M7*

    *S8*

    *Workplace Skills (See Appendix B):*

    *WP1, WP2, WP4, WP6*

48. Describe techniques used in preparing and displaying food for retail sale.
    a. Demonstrate techniques used in preparing and displaying food for retail sale.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*M7*
*S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

49. Identify terms related to plant science.
    a. Define terms related to plant science.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S2, S8*
*Workplace Skills (See Appendix B):*
*WP2, WP4, WP6*

50. Identify and explain major plant parts including roots, stems, leaves, and flowers.
    a. Describe the functions of the root system.
    b. Describe the functions of the stem.
    c. Describe the functions of the leaves.
    d. Describe the functions of the flowers.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S2, S8*
*Workplace Skills (See Appendix B):*
*WP2, WP4, WP6*

51. Explain the important plant growth and food production processes.
    a. Describe photosynthesis.
    b. Describe transpiration.
    c. Describe respiration.
    d. Demonstrate principles of photosynthesis, transpiration, respiration, and absence of plant nutrients.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S2, S8*
*Workplace Skills (See Appendix B):*
*WP2, WP4, WP6*

52. Identify reproductive parts of flowering plants.
    a. Describe a complete flower.
    b. Describe an incomplete flower.
    c. Demonstrate principles of plant pollination.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S2, S8*
*Workplace Skills (See Appendix B):*
*WP2, WP4, WP6*

53. Identify terms related to soil science.
    a. Define terms related to soil science.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S4, S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

54. Identify soil components.
    a. Describe minerals.
    b. Describe air.
    c. Describe water.
    d. Describe organic materials.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S4, S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

55. Identify the layers of a soil profile.
    a. Locate the A Horizon.
    b. Locate the B Horizon.
    c. Locate the C Horizon.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S4, S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

56. Evaluate the soil texture components.
    a. Identify coarse textured soil.
    b. Identify medium textured soil.
    c. Identify fine textured soil.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S4, S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

57. Conduct a plant nutrient experiment.
    a. Conduct a plant nutrient experiment contrasting the different levels of N, P, and K.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S4, S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

58. Conduct a basic soil test.
    a. Perform a basic soil test for N, P, K, and pH.

    *Related Academic Topics (See Appendix A):*
    *C1, C2, C3, C4, C5*
    *S4, S8*

    *Workplace Skills (See Appendix B):*
    *WP1, WP2, WP4, WP6*

59. Define terms related to entomology.
    a. Describe terms related to entomology.

    *Related Academic Topics (See Appendix A):*
    *C1, C2, C3, C4, C5*
    *S3, S8*

    *Workplace Skills (See Appendix B):*
    *WP1, WP2, WP4, WP6*

60. Describe the importance of entomology to agriculture.
    a. Identify beneficial insects.
    b. Identify harmful insects.

    *Related Academic Topics (See Appendix A):*
    *C1, C2, C3, C4, C5*
    *S3, S8*

    *Workplace Skills (See Appendix B):*
    *WP1, WP2, WP4, WP6*

61. Describe the parts of an insect.
    a. Identify the parts of an insect including head, antenna, thorax, abdomen, wings, and legs.

    *Related Academic Topics (See Appendix A):*
    *C1, C2, C3, C4, C5*
    *S3, S8*

    *Workplace Skills (See Appendix B):*
    *WP1, WP2, WP4, WP6*

62. Explain the growth processes of insects.
    a. Describe the gradual (incomplete) metamorphosis.
    b. Describe the complete metamorphosis.

    *Related Academic Topics (See Appendix A):*
    *C1, C2, C3, C4, C5*
    *S3, S8*

    *Workplace Skills (See Appendix B):*
    *WP1, WP2, WP4, WP6*

63. Apply an integrated pest management plan in the greenhouse.
    a. Develop an integrated pest management plan for use in the greenhouse.
    b. Implement an integrated pest management plan in the greenhouse.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S3, S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

64. Define terms related to biotechnology.
    a. Describe terms related to biotechnology.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4*
*S7, S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

65. Explain historical events in biotechnology.
    a. Describe early discoveries before 1800.
    b. Describe basic scientific discoveries 1800 to 1900.
    c. Describe discoveries in molecular biology.
    d. Describe the age of biotechnology (1977 to present).

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4*
*S7, S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

66. Analyze DNA properties.
    a. Match DNA to properties.
    b. Observe crop varieties engineered to resist insects, disease, and chemical damage.
    c. Test crop varieties engineered to resist insects, disease, and chemical damage.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4*
*S7, S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

67. Explain the opportunities for careers in agriscience.
    a. Describe the opportunities for careers in agriscience.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C6*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP3, WP6*

68. Identify activities in middle school, high school, and thereafter to help prepare for agriscience careers.
    a. Participate in activities to help prepare for agriscience careers.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C6*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP3, WP6*

69. Develop resources to obtain career assistance in agriscience.
    a. Describe how careers in agriscience offer opportunities in new and emerging occupations.
    b. Identify educational requirements for a career in agriscience.
    c. Identify resource people for obtaining career information in agriscience.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C6*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP3, WP6*

# SECTION II:

# CURRICULUM GUIDE

# FOR

# INTRODUCTION TO AGRISCIENCE

## INTRODUCTION TO AGRISCIENCE
## UNIT 1: INTRODUCTION TO AGRISCIENCE (5 hours)

**Competencies and Suggested Objectives:**

1. Define terms associated with agriculture, science, and agriscience.
   a. Describe agriculture.
   b. Describe science.
   c. Describe agriscience.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
2. Explain major sciences supporting agriscience.
   a. Describe biology.
   b. Describe chemistry.
   c. Describe biochemistry.
   d. Describe entomology.
   e. Describe horticulture.
   f. Describe agricultural economics.
   f. Describe aquaculture.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
3. Explain current trends occurring in agriscience.
   a. Describe gene transfer.
   b. Describe biotechnology.
   c. Describe tissue culture.
   d. Describe genetic engineering.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*

***Suggested Teaching Strategies:***

*1. Define terms associated with agriculture, science, and agriscience.*
   *a. Discussion and media on agriculture.*

b. *Discussion and media on science.*
c. *Discussion and media on agriscience.*

2. *Explain major sciences supporting agriscience.*
   a. *Written/oral report to describe biology.*
   b. *Written/oral report to describe chemistry.*
   c. *Written/oral report to describe biochemistry.*
   d. *Written/oral report to describe entomology.*
   e. *Written/oral report to describe horticulture.*
   f. *Written/oral report to describe agricultural economics.*
   f. *Written/oral report to describe aquaculture.*
3. *Explain current trends occurring in agriscience.*
   a. *Written/oral report to describe gene transfer.*
   b. *Written/oral report to describe biotechnology.*
   c. *Written/oral report to describe tissue culture.*
   d. *Written/oral report to describe genetic engineering.*

***Suggested Assessment Strategies:***

1. *Define terms associated with agriculture, science, and agriscience.*
   a. *Test - Describe agriculture.*
   b. *Test - Describe science.*
   c. *Test - Describe agriscience.*
2. *Explain major sciences supporting agriscience.*
   a. *Assignment - Describe biology.*
   b. *Assignment - Describe chemistry.*
   c. *Assignment - Describe biochemistry.*
   d. *Assignment - Describe entomology.*
   e. *Assignment - Describe horticulture.*
   f. *Assignment - Describe agricultural economics.*
   f. *Assignment - Describe aquaculture.*
3. *Explain current trends occurring in agriscience.*
   a. *Assignment - Describe gene transfer.*
   b. *Assignment - Describe biotechnology.*
   c. *Assignment - Describe tissue culture.*
   d. *Assignment - Describe genetic engineering.*

**Suggested References:**

Cooper, Elmer. Agriscience: Fundamentals and Applications. Albany, NY: Delmar. 1990.

Instructional Materials Service. Exploring Career Opportunities in Agriculture. Catalog #1050. College Station, TX: Texas A&M University.

**INTRODUCTION TO AGRISCIENCE**
**UNIT 2: INTRODUCTION TO AGRISCIENCE LAB AND SAFETY (5 hours)**

**Competencies and Suggested Objectives:**

1. Describe the basic rules of safety in the agriscience laboratory.
   a. Use chemicals safely.
   b. Use heat and fire safely.
   c. Use laboratory equipment safely.
   d. Work safely with specimens/animals.
   e. Use the electrical equipment.
   f. Report an accident.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP5, WP6*
2. Identify all safety equipment in the agriscience laboratory.
   a. Demonstrate use of all safety equipment in the agriscience laboratory.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP5, WP6*
3. Practice safety concepts in laboratory activities.
   a. Demonstrate electrical safety.
   b. Demonstrate hand safety.
   c. Demonstrate poison safety.
   d. Demonstrate eye safety.
   e. Demonstrate fire safety.
   f. Demonstrate gas precautions.
   g. Demonstrate animal safety.
   h. Demonstrate clothing protection.
   i. Demonstrate plant safety.
   j. Demonstrate prevention of explosion danger.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP5, WP6*

***Suggested Teaching Strategies:***

1. *Describe the basic rules of safety in the agriscience laboratory.*
   *a. Demonstrate procedures for using chemicals safely.*
   *b. Demonstrate procedures for using heat and fire safely.*

c. *Demonstrate procedures for using laboratory equipment safely.*
d. *Demonstrate procedures for working safely with specimens/animals.*
e. *Demonstrate procedures for using the electrical equipment.*
f. *Demonstrate procedures for reporting an accident.*

2. *Identify all safety equipment in the agriscience laboratory.*
   a. *Performance exercise to demonstrate use of all safety equipment in the agriscience laboratory.*
3. *Practice safety concepts in laboratory activities.*
   a. *Performance exercise to demonstrate electrical safety.*
   b. *Performance exercise to demonstrate hand safety.*
   c. *Performance exercise to demonstrate poison safety.*
   d. *Performance exercise to demonstrate eye safety.*
   e. *Performance exercise to demonstrate fire safety.*
   f. *Performance exercise to demonstrate gas precautions.*
   g. *Performance exercise to demonstrate animal safety.*
   h. *Performance exercise to demonstrate clothing protection.*
   i. *Performance exercise to demonstrate plant safety.*
   j. *Performance exercise to demonstrate prevention of explosion danger.*

***Suggested Assessment Strategies:***

1. *Describe the basic rules of safety in the agriscience laboratory.*
   a. *Assignment - Using chemicals safely.*
   b. *Assignment - Using heat and fire safely.*
   c. *Assignment - Using laboratory equipment safely.*
   d. *Assignment - Working safely with specimens/animals.*
   e. *Assignment - Using the electrical equipment.*
   f. *Assignment - Reporting an accident.*
2. *Identify all safety equipment in the agriscience laboratory.*
   a. *Performance Activity - Demonstrate use all of safety equipment in the agriscience laboratory.*
3. *Practice safety concepts in laboratory activities.*
   a. *Performance Activity - Demonstrate electrical safety.*
   b. *Performance Activity - Demonstrate hand safety.*
   c. *Performance Activity - Demonstrate poison safety.*
   d. *Performance Activity - Demonstrate eye safety.*
   e. *Performance Activity - Demonstrate fire safety.*
   f. *Performance Activity - Demonstrate gas precautions.*
   g. *Performance Activity - Demonstrate animal safety.*
   h. *Performance Activity - Demonstrate clothing protection.*
   i. *Performance Activity - Demonstrate plant safety.*
   j. *Performance Activity - Demonstrate prevention of explosion danger.*

**Suggested References:**

Lee, J. S. and Turner, D. L. Introduction to World Agriscience and Technology. Danville, IL: Interstate. 1994.

## INTRODUCTION TO AGRISCIENCE
## UNIT 3: INTRODUCTION TO THE SCIENTIFIC METHOD (5 hours)

**Competencies and Suggested Objectives:**

1. Identify the terms associated with the scientific method.
   a. Define the terms associated with the scientific method.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
2. Describe each step of the scientific method.
   a. Identify the problem.
   b. Gather data.
   c. Formulate possible solutions.
   d. Implement the preferred solutions.
   e. Evaluate the results.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
3. Apply the scientific method.
   a. Identify the problem or question to be answered.
   b. Gather data related to the problem or question.
   c. Formulate possible solutions.
   d. Implement one or a combination of several solutions.
   e. Evaluate the results and pursue further research as needed.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*

***Suggested Teaching Strategies:***

1. *Identify the terms associated with the scientific method.*
   *a. Discussion and media on the terms associated with the scientific method.*
2. *Describe each step of the scientific method.*
   *a. Written/oral report to identify the problem.*
   *b. Written/oral report to gather data.*
   *c. Written/oral report to formulate possible solutions.*

*d. Written/oral report to implement the preferred solutions.*
*e. Written/oral report to evaluate the results.*

*3. Apply the scientific method.*
*a. Performance exercise to identify the problem or question to be answered.*
*b. Performance exercise to gather data related to the problem or question.*
*c. Performance exercise to formulate possible solutions.*
*d. Performance exercise to implement one or a combination of several solutions.*
*e. Performance exercise to evaluate the results and pursue further research as needed.*

***Suggested Assessment Strategies:***

*1. Identify the terms associated with the scientific method.*
*a. Test - Define the terms associated with the scientific method.*
*2. Describe each step of the scientific method.*
*a. Assignment - Identify the problem.*
*b. Assignment - Gather data.*
*c. Assignment - Formulate possible solutions.*
*d. Assignment - Implement the preferred solutions.*
*e. Assignment - Evaluate the results.*
*3. Apply the scientific method.*
*a. Performance Activity - Identify the problem or question to be answered.*
*b. Performance Activity - Gather data related to the problem or question.*
*c. Performance Activity - Formulate possible solutions.*
*d. Performance Activity - Implement one or a combination of several solutions.*
*e. Performance Activity - Evaluate the results and pursue further research as needed.*

**Suggested References:**

Osborne, E. W. Biological Science Applications in Agriculture. Danville, IL: Interstate. 1994.

## INTRODUCTION TO AGRISCIENCE
## UNIT 4: HUMAN RELATIONS/LEADERSHIP IN AGRISCIENCE (5 hours)

**Competencies and Suggested Objectives:**

1. Define the terms related to human relations and leadership.
   a. Describe human relations.
   b. Describe leadership.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
2. Explain acceptable manners in appropriate places.
   a. Demonstrate greeting of a guest.
   b. Demonstrate introductions.
   c. Demonstrate table manners.
   d. Demonstrate telephone manners.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
3. Explain traits of a good leader.
   a. Describe traits of a good leader including integrity, knowledge, courage, tactfulness, enthusiasm, unselfishness, and loyalty.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
4. Describe the role of FFA in developing leadership.
   a. Participate in FFA activities.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
5. Participate in parliamentary procedure.
   a. Define parliamentary terms.
   b. Introduce a motion.
   c. Debate amendments.
   d. Utilize different methods of voting.

e. Discuss taps of the gavel.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*

*S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP6*

6. Explain opportunities for leadership development through the FFA.
   a. Describe contests and awards programs.
   b. Participate in personal development seminars.
   c. Participate in leadership activities and/or leadership conferences and conventions.
   d. Describe national and international exchange programs.
   e. Plan for education experience with industry.
   f. Determine opportunities for participation in personal and community development programs.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*

*S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP6*

***Suggested Teaching Strategies:***

1. *Define the terms related to human relations and leadership.*
   *a. Discussion and media on human relations.*
   *b. Discussion and media on leadership.*
2. *Explain acceptable manners in appropriate places.*
   *a. Assist students to demonstrate greeting of a guest.*
   *b. Assist students to demonstrate introductions.*
   *c. Assist students to demonstrate table manners.*
   *d. Assist students to demonstrate telephone manners.*
3. *Explain traits of a good leader.*
   *a. Discussion and media on traits of a good leader including integrity, knowledge, courage, tactfulness, enthusiasm, unselfishness, and loyalty.*
4. *Describe the role of FFA in developing leadership.*
   *a. Assist students to participate in FFA activities.*
5. *Participate in parliamentary procedure.*
   *a. Discussion and media on parliamentary terms.*
   *b. Performance exercise to introduce a motion.*
   *c. Performance exercise to debate amendments.*
   *d. Performance exercise to utilize different methods of voting.*
   *e. Performance exercise to demonstrate taps of the gavel.*
6. *Explain opportunities for leadership development through the FFA.*
   *a. Written/oral report to describe contests and awards programs.*

b. *Assist students to participate in personal development seminars.*
c. *Assist students to participate in leadership activities and/or leadership conferences and conventions.*
d. *Written/oral report to describe national and international exchange programs.*
e. *Performance exercise to plan for education experience with industry.*
f. *Performance exercise to plan for participation in personal and community development programs.*

***Suggested Assessment Strategies:***

1. *Define the terms related to human relations and leadership.*
   a. *Test - Describe human relations.*
   b. *Test - Describe leadership.*
2. *Explain acceptable manners in appropriate places.*
   a. *Assignment - Demonstrate greeting of a guest.*
   b. *Assignment - Demonstrate introductions.*
   c. *Assignment - Demonstrate table manners.*
   d. *Assignment - Demonstrate telephone manners.*
3. *Explain traits of a good leader.*
   a. *Test - Describe traits of a good leader including integrity, knowledge, courage, tactfulness, enthusiasm, unselfishness, and loyalty.*
4. *Describe the role of FFA in developing leadership.*
   a. *Performance Activity - Participate in FFA activities.*
5. *Participate in parliamentary procedure.*
   a. *Test - Define parliamentary terms.*
   b. *Performance Activity - Introduce a motion.*
   c. *Performance Activity - Debate amendments.*
   d. *Performance Activity - Utilize different methods of voting.*
   e. *Assignment - Discuss taps of the gavel.*
6. *Explain opportunities for leadership development through the FFA.*
   a. *Assignment - Describe contests and awards programs.*
   b. *Performance Activity - Participate in personal development seminars.*
   c. *Performance Activity - Participate in leadership activities and/or leadership conferences and conventions.*
   d. *Assignment - Describe national and international exchange programs.*
   e. *Performance Activity - Plan for education experience with industry.*
   f. *Assignment - Determine opportunities for participation in personal and community development programs.*

**Suggested References:**

Cooper, Elmer. Agriscience: Fundamentals and Applications. Albany, NY: Delmar. 1990.

National FFA Organization. Official FFA Manual Alexandria, VA. Author. 1995.

National FFA Organization. FFA Student Handbook. Alexandria, VA. Author. 1995.

National FFA Organization. FFA Proficiency Awards and Degree Software. Alexandria, VA: Author. Current edition.

Patton, Bob and Harp, Keith. Vocational Agriculture I. Stillwater, OK: Oklahoma Department of Vocational and Technical Education. 1984.

Robert's Rules of Order.

**INTRODUCTION TO AGRISCIENCE**
**UNIT 5: SUPERVISED AGRICULTURAL EXPERIENCE (SAE) IN AGRISCIENCE** **(10 hours)**

**Competencies and Suggested Objectives:**

1. Describe the purposes and requirements of the SAE.
   a. Establish objectives for the SAE.
   b. Determine the availability of time and money to invest.
   c. Select a system of record keeping.
   d. Determine benefits of participation in an SAE.
   e. Determine types of SAE programs.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C4, C5, C6*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
2. Develop a long-range personal plan for the SAE.
   a. Set long-range goals.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C4, C5, C6*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
3. Develop a short-range personal plan.
   a. Set short-range goals.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C4, C5, C6*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
4. Complete a training agreement for an SAE.
   a. Establish requirements of student, parents, supervisor, and/or employer.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C4, C5, C6*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
5. Describe agricultural record keeping for an SAE.
   a. Determine which records to keep and how to maintain each system.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C4, C5, C6*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
6. Maintain agricultural records for an SAE.
   a. Prepare income and expense records.
   b. Prepare inventory records.

c. Compute enterprise summaries.
d. Maintain placement records.
e. Summarize the SAE program.
f. Maintain leadership activity records.
g. Compute a net worth statement.

*Related Academic Topics (See Appendix A):*
*C1, C2, C4, C5, C6*

*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

***Suggested Teaching Strategies:***

1. *Describe the purposes and requirements of the SAE.*
   a. *Assist students to establish objectives for the SAE.*
   b. *Assist students to determine the availability of time and money to invest.*
   c. *Assist students to select a system of record keeping.*
   d. *Assist students to determine benefits of participation in an SAE.*
   e. *Assist students to determine types of SAE programs.*
2. *Develop a long-range personal plan for the SAE.*
   a. *Performance exercise to set long-range goals.*
3. *Develop a short-range personal plan.*
   a. *Performance exercise to set short-range goals.*
4. *Complete a training agreement for an SAE.*
   a. *Performance exercise to establish requirements of student, parents, supervisor, and/or employer.*
5. *Describe agricultural record keeping for an SAE.*
   a. *Performance exercise to determine which records to keep and how to maintain each system.*
6. *Maintain agricultural records for an SAE.*
   a. *Performance exercise to prepare income and expense records.*
   b. *Performance exercise to prepare inventory records.*
   c. *Performance exercise to compute enterprise summaries.*
   d. *Performance exercise to maintain placement records.*
   e. *Performance exercise to summarize the SAE program.*
   f. *Performance exercise to maintain leadership activity records.*
   g. *Performance exercise to compute a net worth statement.*

***Suggested Assessment Strategies:***

1. *Describe the purposes and requirements of the SAE.*
   a. *Assignment - Establish objectives for the SAE.*
   b. *Assignment - Determine the availability of time and money to invest.*
   c. *Assignment - Select a system of record keeping.*

d. *Assignment - Determine benefits of participation in an SAE.*
e. *Assignment - Determine types of SAE programs.*

2. *Develop a long-range personal plan for the SAE.*
   a. *Performance Activity - Set long-range goals.*
3. *Develop a short-range personal plan.*
   a. *Performance Activity - Set short-range goals.*
4. *Complete a training agreement for an SAE.*
   a. *Performance Activity - Establish requirements of student, parents, supervisor, and/or employer.*
5. *Describe agricultural record keeping for an SAE.*
   a. *Performance Activity - Determine which records to keep and how to maintain each system.*
6. *Maintain agricultural records for an SAE.*
   a. *Performance Activity - Prepare income and expense records.*
   b. *Performance Activity - Prepare inventory records.*
   c. *Performance Activity - Compute enterprise summaries.*
   d. *Performance Activity - Maintain placement records.*
   e. *Performance Activity - Summarize the SAE program.*
   f. *Performance Activity - Maintain leadership activity records.*
   g. *Performance Activity - Compute a net worth statement.*

**Suggested References:**

Jobes, R. and Stewart J. Farm and Ranch Business Management (3rd ed.). Moline, IL: Deere & Co. 1992.

National FFA Organization. FFA Proficiency Awards and Degree Software. Alexandria, VA: Author. Current edition.

Newman, M. E. and Willis, W. J. Agribusiness Management and Entrepreneurship. Danville, IL: Interstate. 1994.

## INTRODUCTION TO AGRISCIENCE
## UNIT 6: BASIC AGRICULTURAL INFORMATION SYSTEMS (10 hours)

**Competencies and Suggested Objectives:**

1. Identify agricultural information systems.
   a. Define terms associated with agricultural information systems.
   b. Identify agricultural information systems including Internet, World Wide Web, Cyberspace, Agricultural Satellite Information System (ASIS), Agricultural Extension Service, and CD-ROM.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C4, C5, C6*

   *Workplace Skills (See Appendix B):*
   *WP2, WP3, WP4, WP5, WP6*
2. Use computer applications in agriscience.
   a. Prepare reports.
   b. Manage records.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C4, C5, C6*

   *Workplace Skills (See Appendix B):*
   *WP2, WP3, WP4, WP5, WP6*
3. Communicate using computerized communications.
   a. Send and receive e-mail.
   b. Transfer files.
   c. Log in to remote computer.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C4, C5, C6*

   *Workplace Skills (See Appendix B):*
   *WP2, WP3, WP4, WP5, WP6*
4. Access information available through the ASIS.
   a. Navigate through the system using indexes and system guides.
   b. Retrieve information regarding regulations, educational programming, and weather data.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C4, C5, C6*

   *Workplace Skills (See Appendix B):*
   *WP2, WP3, WP4, WP5, WP6*
5. Access the World Wide Web.
   a. Configure a browser.
   b. Locate an agricultural company home page.
   c. Conduct information searches.

*Related Academic Topics (See Appendix A):*
*C1, C2, C4, C5, C6*
*Workplace Skills (See Appendix B):*
*WP2, WP3, WP4, WP5, WP6*

***Suggested Teaching Strategies:***

1. *Identify agricultural information systems.*
   a. *Discussion and media on terms associated with agricultural information systems.*
   b. *Discussion and media on agricultural information systems including Internet, World Wide Web, Cyberspace, Agricultural Satellite Information System (ASIS), Agricultural Extension Service, and CD-ROM.*
2. *Use computer applications in agriscience.*
   a. *Performance exercise to prepare reports.*
   b. *Performance exercise to manage records.*
3. *Communicate using computerized communications.*
   a. *Performance exercise to send and receive e-mail.*
   b. *Performance exercise to transfer files.*
   c. *Performance exercise to log in to remote computer.*
4. *Access information available through the ASIS.*
   a. *Performance exercise to navigate through the system using indexes and system guides.*
   b. *Performance exercise to retrieve information regarding regulations, educational programming, and weather data.*
5. *Access the World Wide Web.*
   a. *Performance exercise to configure a browser.*
   b. *Performance exercise to locate an agricultural company home page.*
   c. *Performance exercise to conduct information searches.*

***Suggested Assessment Strategies:***

1. *Identify agricultural information systems.*
   a. *Test - Define terms associated with agricultural information systems.*
   b. *Test - Identify agricultural information systems including Internet, World Wide Web, Cyberspace, Agricultural Satellite Information System (ASIS), Agricultural Extension Service, and CD-ROM.*
2. *Use computer applications in agriscience.*
   a. *Performance Activity - Prepare reports.*
   b. *Performance Activity - Manage records.*
3. *Communicate using computerized communications.*
   a. *Performance Activity - Send and receive e-mail.*
   b. *Performance Activity - Transfer files.*
   c. *Performance Activity - Log in to remote computer.*

4. *Access information available through the ASIS.*
   a. *Performance Activity - Navigate through the system using indexes and system guides.*
   b. *Performance Activity - Retrieve information regarding regulations, educational programming, and weather data.*
5. *Access the World Wide Web.*
   a. *Performance Activity - Configure a browser.*
   b. *Performance Activity - Locate an agricultural company home page.*
   c. *Performance Activity - Conduct information searches.*

**Suggested References:**

National FFA Organization. FFA Proficiency Awards and Degree Software. Alexandria, VA: Author. Current edition.

Newman, M. E. and Willis, W. J. Agribusiness Management and Entrepreneurship. Danville, IL: Interstate. 1994.

## INTRODUCTION TO AGRISCIENCE
## UNIT 7: BASIC PRINCIPLES OF ANIMAL SCIENCE (10 hours)

**Competencies and Suggested Objectives:**

1. Identify terms associated with animal science.
   a. Define terms associated with animal science.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S1, S8*

   *Workplace Skills (See Appendix B):*
   *WP2, WP4, WP6*
2. Identify major species of economically important animals.
   a. Describe the economic impact of cattle, sheep, dairy, swine, poultry, and horses.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S1, S8*

   *Workplace Skills (See Appendix B):*
   *WP2, WP4, WP6*
3. Identify two major products or uses of each species.
   a. Describe major products or uses of cattle, sheep, dairy, swine, poultry, and horses.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S1, S8*

   *Workplace Skills (See Appendix B):*
   *WP2, WP4, WP6*
4. Identify the body parts of each species.
   a. Describe the body parts of beef cattle, sheep, dairy cattle, swine, poultry, and horses.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S1, S8*

   *Workplace Skills (See Appendix B):*
   *WP2, WP4, WP6*
5. Describe the wholesale cuts of each species of meat animal.
   a. Evaluate the wholesale cuts of beef cattle, sheep, swine, and poultry.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*M1, M7*
*S1, S8*
*Workplace Skills (See Appendix B):*
*WP2, WP4, WP6*

***Suggested Teaching Strategies:***

1. *Identify terms associated with animal science.*
   a. *Discussion and media on terms associated with animal science.*
2. *Identify major species of economically important animals.*
   a. *Written/oral report to describe the economic impact of cattle, sheep, dairy, swine, poultry, and horses.*
3. *Identify two major products or uses of each species.*
   a. *Written/oral report to describe major products or uses of cattle, sheep, dairy, swine, poultry, and horses.*
4. *Identify the body parts of each species.*
   a. *Discussion and media on the body parts of beef cattle, sheep, dairy cattle, swine, poultry, and horses.*
   b. *Field trips to livestock auctions, sales, and farms to observe meat animals.*
5. *Describe the wholesale cuts of each species.*
   a. *Discussion and media on the wholesale cuts of beef cattle, sheep, swine, and poultry.*
   b. *Participate in FFA Meats Contest.*
   c. *Field trip to meat market to observe preparation of wholesale cuts of meat.*

***Suggested Assessment Strategies:***

1. *Identify terms associated with animal science.*
   a. *Test - Define terms associated with animal science.*
2. *Identify major species of economically important animals.*
   a. *Assignment - Describe the economic impact of cattle, sheep, dairy, swine, poultry, and horses.*
3. *Identify two major products or uses of each species.*
   a. *Assignment - Describe major products or uses of cattle, sheep, dairy, swine, poultry, and horses.*
4. *Identify the body parts of each species.*
   a. *Test - Describe the body parts of cattle, sheep, dairy, swine, poultry, and horses.*
   b. *Written/oral report on field trip to observe meat animals.*

5. *Identify the wholesale cuts of each species.*
   a. *Test - Describe the wholesale cuts of beef cattle, sheep, swine, and poultry.*
   b. *Written/oral report on field trip to meat market to observe wholesale cuts of meat.*

**Suggested References:**

Cooper, Elmer. Agriscience: Fundamentals and Applications. Albany, NY: Delmar. 1990.

Gillespie, J. R. Modern Livestock and Poultry Production. Danville, IL: Interstate. 1992.

Lee, J. S. and Turner, D. L. Introduction to World Agriscience and Technology. Danville, IL: Interstate. 1994.

Osborne, E. W. Biological Science Applications in Agriculture. Danville, IL: Interstate. 1994.

## INTRODUCTION TO AGRISCIENCE
## UNIT 8: MECHANICAL TECHNOLOGY IN AGRISCIENCE (15 hours)

**Competencies and Suggested Objectives:**

1. Identify terms associated with mechanical technology in agriscience.
   a. Define terms associated with mechanical technology in agriscience.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *M1, M4, M7*
   *S6, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP5, WP6*
2. Explain the structure of matter.
   a. Describe protons.
   b. Describe electrons.
   c. Describe neutrons.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *M1, M4, M7*
   *S6, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP5, WP6*
3. Explain properties of matter.
   a. Describe mass.
   b. Describe weight.
   c. Describe volume.
   d. Describe specific gravity.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *M1, M4, M7*
   *S6, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP5, WP6*
4. Use precision measuring devices to determine mass, weight, and volume.
   a. Demonstrate use of balance.
   b. Demonstrate use of scale.
   c. Demonstrate use of graduated cylinder.
   d. Demonstrate use standard measuring devices including rulers, tape measures, micrometers, dividers, and protractors.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

5. Identify the physical properties of specific materials.
   a. Describe the physical properties of water.
   b. Describe the physical properties of oil.
   c. Describe the physical properties of air.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

6. Identify and calculate mechanical advantages of six simple machines including lever, inclined plane, wheel, fulcrum, pulley, and axle.
   a. Describe six simple machines including lever, inclined plane, wheel, fulcrum, pulley, and axle.
   b. Calculate mechanical advantages of six simple machines including lever, inclined plane, wheel, fulcrum, pulley, and axle.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

7. Explain the principle of mechanical advantage by using simple machines.
   a. Demonstrate an example of mechanical advantage by using simple machines.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP5, WP6*

8. Explain the differences between alternating current (AC) and direct current (DC).
   a. Describe the differences between alternating current (AC) and direct current (DC).

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*M1, M4, M7*
*S6, S8*
*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP5, WP6*

9. Demonstrate principles of a simple circuit.
   a. Construct a simple electrical circuit.
   b. Describe the flow of electrons in the circuit.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *M1, M4, M7*
   *S6, S8*
   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP5, WP6*
10. Explain the characteristics of insulators and conductors.
   a. Describe the characteristics of rubber, plastic, and ceramic insulators.
   b. Describe the characteristics of copper and aluminum conductors.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *M1, M4, M7*
   *S6, S8*
   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP5, WP6*
11. Explain the principles of series and parallel circuits.
   a. Construct and describe the characteristics of a series circuit.
   b. Construct and describe the characteristics of a parallel circuit.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *M1, M4, M7*
   *S6, S8*
   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP5, WP6*

***Suggested Teaching Strategies:***

1. *Identify terms associated with mechanical technology in agriscience.*
   a. *Discussion and media on terms associated with mechanical technology in agriscience.*
2. *Explain the structure of matter.*
   a. *Discussion and media on protons.*
   b. *Discussion and media on electrons.*
   c. *Discussion and media on neutrons.*

3. *Explain properties of matter.*
   a. *Discussion and media on mass.*
   b. *Discussion and media on weight.*
   c. *Discussion and media on volume.*
   d. *Discussion and media on specific gravity.*
4. *Use precision measuring devices to determine mass, weight, and volume.*
   a. *Performance exercise to demonstrate use balance.*
   b. *Performance exercise to demonstrate use of scale.*
   c. *Performance exercise to demonstrate use of graduated cylinder.*
   d. *Performance exercise to demonstrate use of standard measuring devices including rulers, tape measures, micrometers, dividers, and protractors.*
5. *Identify the physical properties of specific materials.*
   a. *Written/oral report to describe the physical properties of water.*
   b. *Written/oral report to describe the physical properties of oil.*
   c. *Written/oral report to describe the physical properties of air.*
6. *Identify and calculate mechanical advantages of six simple machines including lever, inclined plane, wheel, fulcrum, pulley, and axle.*
   a. *Written/oral report to describe six simple machines including lever, inclined plane, wheel, fulcrum, pulley, and axle.*
   b. *Performance exercise to calculate mechanical advantages of six simple machines including lever, inclined plane, wheel, fulcrum, pulley, and axle.*
7. *Explain the principle of mechanical advantage by using simple machines.*
   a. *Performance exercise to demonstrate an example of mechanical advantage by using simple machines.*
8. *Explain the differences between alternating current (AC) and direct current (DC).*
   a. *Written/oral report to describe the differences between alternating current (AC) and direct current (DC).*
9. *Demonstrate principles of a simple circuit.*
   a. *Performance exercise to construct a simple electrical circuit.*
   b. *Discussion and media on the flow of electrons in the circuit.*
10. *Explain the characteristics of insulators and conductors.*
   a. *Written/oral report to describe the characteristics of rubber, plastic, and ceramic insulators.*
   b. *Written/oral report to describe the characteristics of copper and aluminum conductors.*
11. *Explain the principles of series and parallel circuits.*
   a. *Performance exercise to construct and describe the characteristics of a series circuit.*
   b. *Performance exercise to construct and describe the characteristics of a parallel circuit.*

***Suggested Assessment Strategies:***

1. *Identify terms associated with mechanical technology in agriscience.*
   a. *Test - Define terms associated with mechanical technology in agriscience.*
2. *Explain the structure of matter.*
   a. *Test - Describe protons.*
   b. *Test - Describe electrons.*
   c. *Test - Describe neutrons.*
3. *Explain properties of matter.*
   a. *Test - Describe mass.*
   b. *Test - Describe weight.*
   c. *Test - Describe volume.*
   d. *Test - Describe specific gravity.*
4. *Use precision measuring devices to determine mass, weight, and volume.*
   a. *Performance Activity - Demonstrate use of balance.*
   b. *Performance Activity - Demonstrate use of scale.*
   c. *Performance Activity - Demonstrate use of graduated cylinder.*
   d. *Performance Activity - Demonstrate use of standard measuring devices including rulers, tape measures, micrometers, dividers, and protractors.*
5. *Identify the physical properties of specific materials.*
   a. *Assignment - Describe the physical properties of water.*
   b. *Assignment - Describe the physical properties of oil.*
   c. *Assignment - Describe the physical properties of air.*
6. *Identify and calculate mechanical advantages of six simple machines including inclined plane, wheel, fulcrum, pulley, and axle.*
   a. *Assignment - Describe six simple machines including lever, inclined plane, wheel, fulcrum, pulley, and axle.*
   b. *Performance Activity - Calculate mechanical advantages of six simple machines including lever, inclined plane, wheel, fulcrum, pulley, and axle.*
7. *Explain the principle of mechanical advantage by using simple machines.*
   a. *Performance Activity - Demonstrate an example of mechanical advantage by using simple machines.*
8. *Explain the differences between alternating current (AC) and direct current (DC).*
   a. *Assignment - Describe the differences between alternating current (AC) and direct current (DC).*
9. *Demonstrate principles of a simple circuit.*
   a. *Performance Activity - Construct a simple electrical circuit.*
   b. *Test - Describe the flow of electrons in the circuit.*
10. *Explain the characteristics of insulators and conductors.*
    a. *Assignment - Describe the characteristics of rubber, plastic, and ceramic insulators.*
    b. *Assignment - Describe the characteristics of copper and aluminum conductors.*

11. *Explain the principles of series and parallel circuits.*
    a. *Performance Activity - Construct and describe the characteristics of a series circuit.*
    b. *Performance Activity - Construct and describe the characteristics of a parallel circuit.*

**Suggested References:**

Buriak, P. & Osborne, E. W. Physical Science Applications in Agriculture. Danville, IL: Interstate. 1995.

Cooper, Elmer. Agriscience: Fundamentals and Applications. Albany, NY: Delmar. 1990.

Cooper, Elmer L. Agricultural Mechanics: Fundamentals and Applications (2nd ed.). Albany, NY: Delmar. 1991.

Johnson, D. M. and Lawver, D. E. Mechanical Technology in Agriculture. Danville, IL: Interstate. 1995.

Phipps, L. J. & Reynolds, C. L. Mechanics in Agriculture (4th ed.). Danville, IL: Interstate. 1991.

## INTRODUCTION TO AGRISCIENCE
## UNIT 9: PRINCIPLES OF FOOD AND FIBER SCIENCE (10 hours)

**Competencies and Suggested Objectives:**

1. Explain the economic scope of major areas of the food industry.
   a. Define terms associated with food and fiber science including producer, harvester, processor, distributor, wholesaler, retailer, and consumer.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *M7*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
2. Explain career opportunities that occur in the food industry.
   a. Describe career opportunities in business.
   b. Describe career opportunities in processing.
   c. Describe career opportunities in communications.
   d. Describe career opportunities in research and development.
   e. Describe career opportunities in quality assurance.
   f. Describe career opportunities in transportation.
   g. Describe career opportunities in education.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *M7*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
3. Explain functions of basic elements of nutrients for humans.
   a. Describe the function of carbohydrates in humans.
   b. Describe the function of fats in humans.
   c. Describe the function of proteins in humans.
   d. Describe the function of vitamins in humans.
   e. Describe the function of minerals in humans.
   f. Describe the function of water in humans.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *M7*
   *S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
4. Explain the process for slaughtering animals for food.
   a. Describe humane killing procedures.

b. Describe sanitary procedures for removal of skin/hair and evisceration.
c. Describe procedures for preparation of carcasses into cuts of meat.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M7*
*S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP6*

5. Explain methods of processing, preserving, and storing foods.
   a. Demonstrate methods of processing, preserving, and storing foods.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M7*
*S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP6*

6. Describe techniques used in preparing and displaying food for retail sale.
   a. Demonstrate techniques used in preparing and displaying food for retail sale.

*Related Academic Topics (See Appendix A):*

*C1, C2, C3, C4, C5*
*M7*
*S8*

*Workplace Skills (See Appendix B):*

*WP1, WP2, WP4, WP6*

***Suggested Teaching Strategies:***

1. *Explain the economic scope of major areas of the food industry.*
   a. *Discussion and media on terms associated with food and fiber science including producer, harvester, processor, distributor, wholesaler, retailer, and consumer.*
2. *Explain career opportunities that occur in the food industry.*
   a. *Written/oral report to describe career opportunities in business.*
   b. *Written/oral report to describe career opportunities in processing.*
   c. *Written/oral report to describe career opportunities in communications.*
   d. *Written/oral report to describe career opportunities in research and development.*
   e. *Written/oral report to describe career opportunities in quality assurance.*
   f. *Written/oral report to describe career opportunities in transportation.*
   g. *Written/oral report to describe career opportunities in education.*
3. *Explain functions of basic elements of nutrients for humans.*
   a. *Discussion and media on carbohydrates.*
   b. *Discussion and media on fats.*

c. *Discussion and media on proteins.*
d. *Discussion and media on vitamins.*
e. *Discussion and media on minerals.*
f. *Discussion and media on water.*

4. *Explain the process for slaughtering animals for food.*
   a. *Discussion and media on humane killing procedures and field trip to observe procedures.*
   b. *Discussion and media on sanitary procedures for removal of skin/hair and evisceration and field trip to observe procedures.*
   c. *Discussion and media on procedures for preparation of carcasses into cuts of meat and field trip to observe procedures.*
5. *Explain methods of processing, preserving, and storing foods.*
   a. *Performance exercise to demonstrate methods of processing, preserving, and storing foods and field trip to observe procedures.*
6. *Describe techniques used in preparing and displaying food for retail sale.*
   a. *Performance exercise to demonstrate techniques used in preparing and displaying food for retail sale and field trip to observe procedures.*

***Suggested Assessment Strategies:***

1. *Explain the economic scope of major areas of the food industry.*
   a. *Test - Define terms associated with food and fiber science including producer, harvester, processor, distributor, wholesaler, retailer, and consumer.*
2. *Explain career opportunities that occur in the food industry.*
   a. *Assignment - Describe career opportunities in business.*
   b. *Assignment - Describe career opportunities in processing.*
   c. *Assignment - Describe career opportunities in communications.*
   d. *Assignment - Describe career opportunities in research and development.*
   e. *Assignment - Describe career opportunities in quality assurance.*
   f. *Assignment - Describe career opportunities in transportation.*
   g. *Assignment - Describe career opportunities in education.*
3. *Explain functions of basic elements of nutrients for humans.*
   a. *Test - Describe the function of carbohydrates in humans.*
   b. *Test - Describe the function of fats in humans.*
   c. *Test - Describe the function of proteins in humans.*
   d. *Test - Describe the function of vitamins in humans.*
   e. *Test - Describe the function of minerals in humans.*
   f. *Test - Describe the function of water in humans.*
4. *Explain the process for slaughtering animals for food.*
   a. *Test - Describe humane killing procedures.*
   b. *Test - Describe sanitary procedures for removal of skin/hair and evisceration.*
   c. *Test - Describe procedures for preparation of carcasses into cuts of meat.*

5. *Explain methods of processing, preserving, and storing foods.*
   a. *Performance Activity - Demonstrate methods of processing, preserving, and storing foods.*
6. *Describe techniques used in preparing and displaying food for retail sale.*
   a. *Performance Activity - Demonstrate techniques used in preparing and displaying food for retail sale.*

**Suggested References:**

Cooper, Elmer. Agriscience: Fundamentals and Applications. Albany, NY: Delmar. 1990.

Osborne, E. W. Biological Science Applications in Agriculture. Danville, IL: Interstate. 1994.

**INTRODUCTION TO AGRISCIENCE**
**UNIT 10: PRINCIPLES OF PLANT SCIENCE** **(10 hours)**

**Competencies and Suggested Objectives:**

1. Identify terms related to plant science.
   a. Define terms related to plant science.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S2, S8*

   *Workplace Skills (See Appendix B):*
   *WP2, WP4, WP6*
2. Identify and explain major plant parts including roots, stems, leaves, and flowers.
   a. Describe the functions of the root system.
   b. Describe the functions of the stem.
   c. Describe the functions of the leaves.
   d. Describe the functions of the flowers.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S2, S8*

   *Workplace Skills (See Appendix B):*
   *WP2, WP4, WP6*
3. Explain the important plant growth and food production processes.
   a. Describe photosynthesis.
   b. Describe transpiration.
   c. Describe respiration.
   d. Demonstrate principles of photosynthesis, transpiration, respiration, and absence of plant nutrients.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S2, S8*

   *Workplace Skills (See Appendix B):*
   *WP2, WP4, WP6*
4. Identify reproductive parts of flowering plants.
   a. Describe a complete flower.
   b. Describe an incomplete flower.
   c. Demonstrate principles of plant pollination.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S2, S8*

   *Workplace Skills (See Appendix B):*
   *WP2, WP4, WP6*

***Suggested Teaching Strategies:***

1. *Identify terms related to plant science.*
   a. *Discussion and media on terms related to plant science.*
2. *Identify and explain major plant parts including roots, stems, leaves, and flowers.*
   a. *Observe laboratory specimens to describe the functions of the root system.*
   b. *Observe laboratory specimens to describe the functions of the stem.*
   c. *Observe laboratory specimens to describe the functions of the leaves.*
   d. *Observe laboratory specimens to describe the functions of the flowers.*
3. *Explain the important plant growth and food production processes.*
   a. *Discussion and media on photosynthesis.*
   b. *Discussion and media on transpiration.*
   c. *Discussion and media on respiration.*
   d. *Conduct experiments to demonstrate principles of photosynthesis, transpiration, respiration, and absence of plant nutrients.*
4. *Identify reproductive parts of flowering plants.*
   a. *Diagram and label parts of a complete flower.*
   b. *Diagram and label parts of an incomplete flower.*
   c. *Conduct experiments to demonstrate principles of plant pollination.*

***Suggested Assessment Strategies:***

1. *Identify terms related to plant science.*
   a. *Test - Define terms related to plant science.*
2. *Identify and explain major plant parts including roots, stems, leaves, and flowers.*
   a. *Assignment - Describe the functions of the root system.*
   b. *Assignment - Describe the functions of the stem.*
   c. *Assignment - Describe the functions of the leaves.*
   d. *Assignment - Describe the functions of the flowers.*
3. *Explain the important plant growth and food production processes.*
   a. *Test - Describe photosynthesis.*
   b. *Test - Describe transpiration.*
   c. *Test - Describe respiration.*
   d. *Assignment - Conduct experiments to demonstrate principles of photosynthesis, transpiration, respiration, and absence of plant nutrients.*
4. *Identify reproductive parts of flowering plants.*
   a. *Test - Describe a complete flower.*
   b. *Test - Describe an incomplete flower.*
   c. *Assignment - Conduct experiments to demonstrate principles of plant pollination.*

**Suggested References:**

Cooper, Elmer. Agriscience: Fundamentals and Applications. Albany, NY: Delmar. 1990.

CORD Materials (Biological Science).

Lee, J. S. and Turner, D. L. Introduction to World Agriscience and Technology. Danville, IL: Interstate. 1994.

Osborne, E. W. Biological Science Applications in Agriculture. Danville, IL: Interstate. 1994.

**INTRODUCTION TO AGRISCIENCE**
**UNIT 11: PRINCIPLES OF SOIL SCIENCE** **(10 hours)**

**Competencies and Suggested Objectives:**

1. Identify terms related to soil science.
   a. Define terms related to soil science.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S4, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
2. Identify soil components.
   a. Describe minerals.
   b. Describe air.
   c. Describe water.
   d. Describe organic materials.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *M1, M4, M7*
   *S4, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
3. Identify the layers of a soil profile.
   a. Locate the A Horizon.
   b. Locate the B Horizon.
   c. Locate the C Horizon.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S4, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
4. Evaluate the soil texture components.
   a. Identify coarse textured soil.
   b. Identify medium textured soil.
   c. Identify fine textured soil.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S4, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*

5. Conduct a plant nutrient experiment.
   a. Conduct a plant nutrient experiment contrasting the different levels of N, P, and K.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S4, S8*

*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

6. Conduct a basic soil test.
   a. Perform a basic soil test for N, P, K, and pH.

*Related Academic Topics (See Appendix A):*
*C1, C2, C3, C4, C5*
*S4, S8*

*Workplace Skills (See Appendix B):*
*WP1, WP2, WP4, WP6*

***Suggested Teaching Strategies:***

1. *Identify terms related to soil science.*
   a. *Discussion and media on terms related to soil science and participate in FFA Soil Judging Contest.*
2. *Identify soil components.*
   a *Written/oral report to describe minerals.*
   b. *Written/oral report to describe air.*
   c. *Written/oral report to describe water.*
   d. *Written/oral report to describe organic materials.*
3. *Identify the layers of a soil profile.*
   a. *Performance exercise to locate the A Horizon.*
   b. *Performance exercise to locate the B Horizon.*
   c. *Performance exercise to locate the C Horizon.*
4. *Evaluate the soil texture components.*
   a. *Performance exercise to identify coarse textured soil.*
   b. *Performance exercise to identify medium textured soil.*
   c. *Performance exercise to identify fine textured soil.*
5. *Conduct a plant nutrient experiment.*
   a. *Performance exercise to conduct a plant nutrient experiment contrasting the different levels of N, P, and K.*
6. *Conduct a basic soil test.*
   a. *Performance exercise to perform a basic soil test for N, P, K, and pH.*

***Suggested Assessment Strategies:***

1. *Identify terms related to soil science.*
   a. *Test - Define terms related to soil science.*

2. *Identify soil components.*
   a. *Assignment - Describe minerals.*
   b. *Assignment - Describe air.*
   c. *Assignment - Describe water.*
   d. *Assignment - Describe organic materials.*
3. *Identify the layers of a soil profile.*
   a. *Performance Activity - Locate the A Horizon.*
   b. *Performance Activity - Locate the B Horizon.*
   c. *Performance Activity - Locate the C Horizon.*
4. *Evaluate the soil texture components.*
   a. *Performance Activity - Identify coarse textured soil.*
   b. *Performance Activity - Identify medium textured soil.*
   c. *Performance Activity - Identify fine textured soil.*
5. *Conduct a plant nutrient experiment*
   a. *Performance Activity - Conduct a plant nutrient experiment contrasting the different levels of N, P, and K.*
6. *Conduct a basic soil test.*
   a. *Performance Activity - Perform a basic soil test for N, P, K, and pH.*

**Suggested References:**

Cooper, Elmer. Agriscience: Fundamentals and Applications. Albany, NY: Delmar. 1990.

Lee, J. S. and Turner, D. L. Introduction to World Agriscience and Technology. Danville, IL: Interstate. 1994.

**INTRODUCTION TO AGRISCIENCE**
**UNIT 12: PRINCIPLES OF ENTOMOLOGY** **(10 hours)**

**Competencies and Suggested Objectives:**

1. Define terms related to entomology.
   a. Describe terms related to entomology.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S3, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
2. Describe the importance of entomology to agriculture.
   a. Identify beneficial insects.
   b. Identify harmful insects.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S3, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
3. Describe the parts of an insect.
   a. Identify the parts of an insect including head, antenna, thorax, abdomen, wings, and legs.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S3, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
4. Explain the growth processes of insects.
   a. Describe the gradual (incomplete) metamorphosis.
   b. Describe the complete metamorphosis.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*
   *S3, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
5. Apply an integrated pest management plan in the greenhouse.
   a. Develop an integrated pest management plan for use in the greenhouse.
   b. Implement an integrated pest management plan in the greenhouse.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C5*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*

***Suggested Teaching Strategies:***

1. *Define terms related to entomology.*
   a. *Discussion and media on terms related to entomology.*
2. *Describe the importance of entomology to agriculture.*
   a. *Conduct field trip to identify beneficial insects and their contributions.*
   b. *Conduct field trip to identify harmful insects and results of their damage.*
3. *Describe the parts of an insect.*
   a. *Observe laboratory specimens to identify the parts of an insect including head, antenna, thorax, abdomen, wings, and legs.*
4. *Explain the growth processes of insects.*
   a. *Written/oral report to describe the gradual (incomplete) metamorphosis.*
   b. *Written/oral report to describe complete metamorphosis.*
5. *Apply an integrated pest management plan in the greenhouse.*
   a. *Performance exercise to develop an integrated pest management plan for use in the greenhouse.*
   b. *Performance exercise to implement an integrated pest management plan in the greenhouse.*

***Suggested Assessment Strategies:***

1. *Define terms related to entomology.*
   a. *Test - Describe terms related to entomology.*
2. *Describe the importance of entomology to agriculture.*
   a. *Assignment - Identify beneficial insects.*
   b. *Assignment - Identify harmful insects.*
3. *Describe the parts of an insect.*
   a. *Assignment - Identify the parts of an insect including head, antenna, thorax, abdomen, wings, and legs.*
4. *Explain the growth processes of insects.*
   a. *Assignment - Describe the gradual (incomplete) metamorphosis.*
   b. *Assignment - Describe the complete metamorphosis.*
5. *Apply an integrated pest management plan in the greenhouse.*
   a. *Performance Activity - Develop an integrated pest management plan for use in the greenhouse.*
   b. *Performance Activity - Implement an integrated pest management plan in the greenhouse.*

**Suggested References:**

Cooper, Elmer. Agriscience: Fundamentals and Applications. Albany, NY: Delmar. 1990.

Johnson, D. M. (Ed.) Agriscience Learning Activities Manual. Mississippi State University, MS: RCU. 1991.

## INTRODUCTION TO AGRISCIENCE
## UNIT 13: INTRODUCTION TO BIOTECHNOLOGY (10 hours)

**Competencies and Suggested Objectives:**

1. Define terms related to biotechnology.
   a. Describe terms related to biotechnology.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4*
   *S7, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
2. Explain historical events in biotechnology.
   a. Describe early discoveries before 1800.
   b. Describe basic scientific discoveries 1800 to 1900.
   c. Describe discoveries in molecular biology.
   d. Describe the age of biotechnology (1977 to present).

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4*
   *S7, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*
3. Analyze DNA properties.
   a. Match DNA to properties.
   b. Observe crop varieties engineered to resist insects, disease, and chemical damage.
   c. Test crop varieties engineered to resist insects, disease, and chemical damage.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4*
   *S7, S8*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP4, WP6*

***Suggested Teaching Strategies:***

*1. Define terms related to biotechnology.*
   *a. Discussion and media on terms related to biotechnology.*
*2. Explain historical events in biotechnology.*
   *a. Written oral report to describe early discoveries before 1800.*
   *b. Written oral report to describe basic scientific discoveries 1800 to 1900.*

c. *Written/oral report to describe discoveries in molecular biology.*
d. *Written/oral report to describe the age of biotechnology (1977 to present).*

3. *Analyze DNA properties.*
   a. *Performance exercise to match DNA to properties.*
   b. *Performance exercise to observe crop varieties engineered to resist insects, disease, and chemical damage.*
   c. *Performance exercise to test crop varieties engineered to resist insects, disease, and chemical damage.*

***Suggested Assessment Strategies:***

1. *Define terms related to biotechnology.*
   a. *Test - Describe terms related to biotechnology.*
2. *Explain historical events in biotechnology.*
   a. *Assignment - Describe early discoveries before 1800.*
   b. *Assignment - Describe basic scientific discoveries 1800 to 1900.*
   c. *Assignment - Describe discoveries in molecular biology.*
   d. *Assignment - Describe the age of biotechnology (1977 to present).*
3. *Analyze DNA properties.*
   a. *Performance Activity - Match DNA to properties.*
   b. *Performance Activity - Observe crop varieties engineered to resist insects, disease, and chemical damage.*
   c. *Performance Activity - Test crop varieties engineered to resist insects, disease, and chemical damage.*

**Suggested References:**

Burton, L. D. Agriscience and Technology. Albany, NY: Delmar. 1992.

Cooper, Elmer. Agriscience: Fundamentals and Applications. Albany, NY: Delmar. 1990.

Lee, J. S. and Turner, D. L. Introduction to World Agriscience and Technology. Danville, IL: Interstate. 1994.

Osborne, E. W. Biological Science Applications in Agriculture. Danville, IL: Interstate. 1994.

Peterson, D. R. and Rehberger, T. Biotechnology in Agriculture. Stillwater, OK: MAVCC. 1992.

**INTRODUCTION TO AGRISCIENCE**
**UNIT 14: OPPORTUNITIES IN AGRISCIENCE** **(10 hours)**

**Competencies and Suggested Objectives:**

1. Explain the opportunities for careers in agriscience.
   a. Describe the opportunities for careers in agriscience.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C6*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP3, WP6*
2. Identify activities in middle school, high school, and thereafter to help prepare for agriscience careers.
   a. Participate in activities to help prepare for agriscience careers.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C6*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP3, WP6*
3. Develop resources to obtain career assistance in agriscience.
   a. Describe how careers in agriscience offer opportunities in new and emerging occupations.
   b. Identify educational requirements for a career in agriscience.
   c. Identify resource people for obtaining career information in agriscience.

   *Related Academic Topics (See Appendix A):*
   *C1, C2, C3, C4, C6*

   *Workplace Skills (See Appendix B):*
   *WP1, WP2, WP3, WP6*

***Suggested Teaching Strategies:***

1. *Explain the opportunities for careers in agriscience.*
   *a. Written/oral report to describe how careers in agriscience offer opportunities in new and emerging occupations.*
2. *Identify activities in middle school, high school, and thereafter to help prepare for agriscience careers.*
   *a. Assist students to participate in activities to help prepare for agriscience careers.*
3. *Develop resources to obtain career assistance in agriscience.*
   *a. Written/oral report to describe how careers in agriscience offer opportunities in new and emerging occupations.*
   *b. Written/oral report to identify educational requirements for a career in agriscience.*

c. *Assist students to identify resource people for obtaining career information in agriscience.*

***Suggested Assessment Strategies:***

1. *Explain the opportunities for careers in agriscience.*
   a. *Assignment - Describe the opportunities for careers in agriscience.*
2. *Identify activities in middle school, high school, and thereafter to help prepare for agriscience careers.*
   a. *Assignment - Participate in activities to help prepare for agriscience careers.*
3. *Develop resources to obtain career assistance in agriscience.*
   a. *Assignment - Describe how careers in agriscience offer opportunities in new and emerging occupations.*
   b. *Assignment - Identify educational requirements for a career in agriscience.*
   c. *Assignment - Identify resource people for obtaining career information in agriscience.*

**Suggested References:**

Cooper, Elmer. Agriscience: Fundamentals and Applications. Albany, NY: Delmar. 1990.

Instructional Materials Service. Exploring Career Opportunities in Agriculture. Catalog #1050. College Station, TX: Texas A&M University.

# SECTION III:

# RECOMMENDED TOOLS AND EQUIPMENT

# RECOMMENDED TOOLS AND EQUIPMENT FOR INTRODUCTION TO AGRISCIENCE
(Quantity for a class of 20 students)

1. African violet culture kit (1)
2. Air pollution sampling pump, battery powered (1)
3. Air pollution study kit (2)
4. Apron, lab (20)
5. Aquaculture system, complete recirculating (1)
6. Aquarium, 20-30 gallon (unless larger aquaculture tanks are purchased) (1)
7. Autoclave (Optional) (1)
8. Balance, triple beam (1)
9. Blender, food (1)
10. Bottle, narrow necked w/cork stopper (10)
11. Bowl, mixing (1)
12. Brooder (1)
13. Cabinet and sanitizer (for goggles) (1)
14. Cabinet (for hazardous chemicals) (1)
15. Cabinet, storage (4)
16. Calculator (10)
17. Centrifuge (Optional) (1)
18. Colorimeter (Optional, replace with spectrophotometer) (1)
19. Computer w/internal modem, CD-ROM drive, color monitor, SDE specs (10)
20. Dehydrator (1)
21. Dissecting kit (10)
22. Dissecting pan (10)
23. Dividers (10)
24. Engraving tool (1)
25. Eye wash station (installed on water line) (1)
26. First aid kit (adequate for 20 students) (1)
27. Gauge, feeler (5)
28. Gloves, rubber (200 pair)
29. Goggles, splash type (20)
30. Graduated cylinder, 25 ml (4)
31. Greenhouse, 20'x 30' w/drip pad, fans, heaters, and irrigation system (1)
32. Ground water simulation (1)
33. Hot plate (or electric skillet--some heat source is needed) (1)
34. Increment borer (1)
35. Incubator, culture (1)
36. Incubator, egg (may replace with large brooder in poultry areas) (2)
37. Lab equipment set (1)
38. Laminar flow cabinet (may replace with culture cabinet) (1)
39. Mat, propagation (1)
40. Meter, pH (1)

41. Meter, light (1)
42. Meter, dissolved oxygen (necessary w/aquaculture system) (1)
43. Microcomputer based laboratory w/probes for temperature, motion, and light (1)
44. Micrometer, outside (5)
45. Microscope, student, stereomicroscope, binocular (2x to 4x) (5)
46. Microscope, student binocular (10x to 45x) (5)
47. Microwave (1)
48. Nematode study kits (2)
49. Net, insect (5)
50. Petri dishes w/cover, plastic disposable (100)
51. Pipette stand w/clamps (5)
52. Plant benches (10)
53. Plant flats (100)
54. Plant tissue culture kit (1)
55. Plant tissue test kit (1)
56. Plastic cups, thermal insulated w/tops, 32 oz (5)
57. Printer (5)
58. Pulley, double (2)
59. Pulley, single (2)
60. Pulley, triple (2)
61. Refrigerator, 21 cu. ft. minimum (1)
62. Respirator, chemical (5)
63. Rule, pocket, 1/32" and 1/64" graudations (10)
64. Scale, electronic balance (1)
65. Scale, spring (1)
66. Shade cloth (1)
67. Slide, microscope (100)
68. Small gas engine tool kit (Briggs & Stratton) (5)
69. Small gas engines (Briggs & Stratton, 3-5 hp) (5)
70. Soil tube sampler, 36" w/step (1)
71. Soil test kit, comprehensive (5)
72. Spectrophotometer, digital (Optional, may replace with colorimeter) (1)
73. Sprayer, 3 gal (1)
74. Stool, metal (20)
75. Syringe, 3 cc (10)
76. Syringe, 60 cc (10)
77. Table, student laboratory (6)
78. Tank, artificial insemination (Optional, only if live insemination is conducted) (1)
79. Tape measure (10)
80. Thermometer (5)
81. Tissue culture cabinet or incubator (1)
82. Titration burette, 50 ml (4)
83. Trap, insect (10

84. Tree scale stick (5)
85. Voltmeter, triple range (5)
86. Water pollution detection kit (Lamotte)(Aquaculture--Replace with Hach Farm Pond Test Kit) (1)
87. Wheelbarrow (1)
88. Wisconsin fast plants light system (1)
89. Wisconsin fast plants classroom growth & development kit (3)

## RECOMMENDED INSTRUCTIONAL AIDS

1. Agricultural Satellite Information System (ASIS) (1)
2. Camcorder w/tripod and carrying case (1)
3. Cart, A (for TV-VCR) (1)
4. Cart, AV (for overhead projector) (1)
5. Computer LCD display panel (to show computer on overhead projector) (1)
6. Digital camera (for use with micro video system) (1)
7. Micro video system (1)
8. Overhead projector (high intensity for use with LCD panel) (1)
9. Phone service for Internet connection (1)
10. Microscope, teaching, stereomicroscope (Z eyepieces, teaching microscope, light enclosed) (1)
11. Microscope, advanced teaching, trinocular (10x to 100x, oil immersion) (1)
12. TV-VCR (1)
13. Video out (Microcomputer to TV monitor) (1)

# APPENDIX A:

# RELATED ACADEMIC TOPICS

APPENDIX A

## RELATED ACADEMIC TOPICS FOR COMMUNICATIONS

C1 Interpret written material.
C2 Interpret visual materials (maps, charts, graphs, tables, etc.).
C3 Listen, comprehend, and take appropriate actions.
C4 Access, organize, and evaluate information.
C5 Use written and/or oral language skills to work cooperatively to solve problems, make decisions, take actions, and reach agreement.
C6 Communicate ideas and information effectively using various oral and written forms for a variety of audiences and purposes.

## EXPANDED TOPICS FOR COMMUNICATIONS

### TOPIC C1: Interpret written material.

C1.01 Read and follow complex written directions.
C1.02 Recognize common words and meanings associated with a variety of occupations.
C1.03 Adjust reading strategy to purpose and type of reading.
C1.04 Use sections of books and reference sources to obtain information.
C1.05 Compare information from multiple sources and check validity.
C1.06 Interpret items and abbreviations used in multiple forms.
C1.07 Interpret short notes, memos, and letters.
C1.08 Comprehend technical words and concepts.
C1.09 Use various reading techniques depending on purpose for reading.
C1.10 Find, read, understand, and use information from printed matter or electronic sources.

### TOPIC C2: Interpret visual materials (maps, charts, graphs, tables, etc.).

C2.01 Use visuals in written and in oral presentations.
C2.02 Recognize visual cues to meaning (layout, typography, etc.).
C2.03 Interpret and apply information using visual materials.

### TOPIC C3: Listen, comprehend, and take appropriate action.

C3.01 Identify and evaluate orally-presented messages according to purpose.
C3.02 Recognize barriers to effective listening.
C3.03 Recognize how voice inflection changes meaning.
C3.04 Identify speaker signals requiring a response and respond accordingly.
C3.05 Listen attentively and take accurate notes.
C3.06 Use telephone to receive information.

C3.07 Analyze and distinguish information from formal and informal oral presentations.

TOPIC C4: Access, organize, and evaluate information.

C4.01 Distinguish fact from opinion.
C4.02 Use various print and non-print sources for specialized information.
C4.03 Interpret and distinguish between literal and figurative meaning.
C4.04 Interpret written or oral communication in relation to context and writer's point of view.
C4.05 Use relevant sources to gather information for written or oral communication.

TOPIC C5: Use written and/or oral language skills to work cooperatively to solve problems, make decisions, take actions, and reach agreement.

C5.01 Select appropriate words for communication needs.
C5.02 Use reading, writing, listening, and speaking skills to solve problems.
C5.03 Compose inquiries and requests.
C5.04 Write persuasive letters and memos.
C5.05 Edit written reports, letters, memos, and short notes for clarity, correct grammar, and effective sentences.
C5.06 Write logical and understandable statements, phrases, or sentences for filling out forms, for correspondence or reports.
C5.07 Write directions or summaries of processes, mechanisms, events, or concepts.
C5.08 Select and use appropriate formats for presenting reports.
C5.09 Convey information to audiences in writing.
C5.10 Compose technical reports and correspondence that meet accepted standards for written communications.

TOPIC C6: Communicate ideas and information using oral and written forms for a variety of audiences and purposes.

C6.01 Give complex oral instructions.
C6.02 Describe a business or industrial process/mechanism.
C6.03 Participate effectively in group discussions and decision making.
C6.04 Produce effective oral messages utilizing different media.
C6.05 Explore ideas orally with partners.
C6.06 Participate in conversations by volunteering information when appropriate and asking relevant questions when appropriate.
C6.07 Restate or paraphrase a conversation to confirm one's own understanding.
C6.08 Gather and provide information utilizing different media.

C6.09 Prepare and deliver persuasive, descriptive, and demonstrative oral presentations.

**RELATED ACADEMIC TOPICS FOR MATHEMATICS**

M1 Relate number relationships, number systems, and number theory.
M2 Explore patterns and functions.
M3 Explore algebraic concepts and processes.
M4 Explore the concepts of measurement.
M5 Explore the geometry of one-, two-, and three-dimensions.
M6 Explore concepts of statistics and probability in real world situations.
M7 Apply mathematical methods, concepts, and properties to solve a variety of real-world problems.

EXPANDED TOPICS FOR MATHEMATICS

TOPIC M1: Relate number relationships, number systems, and number theory.

M1.01 Understand, represent, and use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, and scientific notation) in real world and mathematical problem situations.
M1.02 Develop number sense for whole numbers, fractions, decimals, integers, and rational numbers.
M1.03 Understand and apply ratios, proportions, and percents in a wide variety of situations.
M1.04 Investigate relationships among fractions, decimals, and percents.
M1.05 Compute with whole numbers, fractions, decimals, integers, and rational numbers.
M1.06 Develop, analyze, and explain procedures for computation and techniques for estimations.
M1.07 Select and use an appropriate method for computing from among mental arithmetic, paper-and-pencil, calculator, and computer methods.
M1.08 Use computation, estimation, and proportions to solve problems.
M1.09 Use estimation to check the reasonableness of results.

TOPIC M2: Explore patterns and functions.

M2.01 Describe, extend, analyze, and create a wide variety of patterns.
M2.02 Describe and represent relationships with tables, graphs, and rules.
M2.03 Analyze functional relationships to explain how a change in one quantity results in a change in another.
M2.04 Use patterns and functions to represent and solve problems.
M2.05 Explore problems and describe results using graphical, numerical, physical, algebraic, and verbal mathematical models or representations.

M2.06 Use a mathematical idea to further their understanding of other mathematical ideas.

M2.07 Apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as art, music, and business.

TOPIC M3: Explore algebraic concepts and processes.

M3.01 Represent situations and explore the interrelationships of number patterns with tables, graphs, verbal rules, and equations.

M3.02 Analyze tables and graphs to identify properties and relationships and to interpret expressions and equations.

M3.03 Apply algebraic methods to solve a variety of real world and mathematical problems.

TOPIC M4: Explore the concepts of measurement.

M4.01 Estimate, make,and use measurements to describe and compare phenomena.

M4.02 Select appropriate units and tools to measure to the degree of accuracy required in a particular situation.

M4.03 Extend understanding of the concepts of perimeter, area, volume, angle measure, capacity, and weight and mass.

M4.04 Understand and apply reasoning processes, with special attention to spatial reasoning and reasoning with proportions and graphs.

TOPIC M5: Explore the geometry of one-, two-, and three-dimensions.

M5.01 Identify, describe, compare, and classify geometric figures.

M5.02 Visualize and represent geometric figures with special attention to developing spatial sense.

M5.03 Explore transformations of geometric figures.

M5.04 Understand and apply geometric properties and relationships.

M5.05 Classify figures in terms of congruence and similarity and apply these relationships.

TOPIC M6: Explore the concepts of statistics and probability in real world situations.

M6.01 Systematically collect, organize, and describe data.

M6.02 Construct, read, and interpret tables, charts, and graphs.

M6.03 Develop an appreciation for statistical methods as powerful means for decision making.

M6.04 Make predictions that are based on exponential or theoretical probabilities.

M6.05 Develop an appreciation for the pervasive use of probability in the real world.

TOPIC M7: Apply mathematical methods, concepts, and properties to solve a variety of real-world problems.

M7.01 Use computers and/or calculators to process information for all mathematical situations.
M7.02 Use problem-solving approaches to investigate and understand mathematical content.
M7.03 Formulate problems from situations within and outside mathematics.
M7.04 Generalize solutions and strategies to new problem situations.

**RELATED ACADEMIC TOPICS FOR SCIENCE**

S1 Explain the Anatomy and Physiology of the human body.
S2 Apply the basic biological principles of Plants, Viruses and Monerans, Algae, Protista, and Fungi.
S3 Relate the nine major phyla of the kingdom anomaly according to morphology, anatomy, and physiology.
S4 Explore the chemical and physical properties of the earth to include Geology, Meteorology, Oceanography, and the Hydrologic Cycle.
S5 Investigate the properties and reactions of matter to include symbols, formulas and nomenclature, chemical equations, gas laws, chemical bonding, acid-base reactions, equilibrium, oxidation-reduction, nuclear chemistry, and organic chemistry.
S6 Explore the principles and theories related to motion, mechanics, electricity, magnetism, light energy, thermal energy, wave energy, and nuclear physics.
S7 Explore the principles of genetic and molecular Biology to include the relationship between traits and patterns of inheritance, population genetics, the structure and function of DNA, and current applications of DNA technology.
S8 Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

EXPANDED TOPICS FOR SCIENCE

TOPIC S1: Explain the Anatomy and Physiology of the human body.

S1.01 Recognize common terminology and meanings.
S1.02 Explore the relationship of the cell to more complex systems within the body.

S1.03 Summarize the functional anatomy of all the major body systems.
S1.04 Relate the physiology of the major body systems to its corresponding anatomy.
S1.05 Compare and contrast disease transmission and treatment within each organ system.
S1.06 Explore the usage of medical technology as related to human organs and organ systems.
S1.07 Explain the chemical composition of body tissue.

TOPIC S2: Apply the basic biological principles of Plants, Viruses and Monerans, Algae, Protista, and Fungi.

S2.01 Identify the major types and structures of plants, viruses, monera, algae protista, and fungi.
S2.02 Explain sexual and asexual reproduction.
S2.03 Describe the ecological importance of plants as related to the environment.
S2.04 Analyze the physical chemical and behavioral process of a plant.

TOPIC S3: Relate the nine major phyla of the kingdom anomaly according to morphology, anatomy, and physiology.

S3.01 Explain the morphology, anatomy, and physiology of animals.
S3.02 Describe the characteristics, behaviors, and habitats of selected animals.

TOPIC S4: Explore the chemical and physical properties of the earth to include Geology, Meteorology, Oceanography, and the Hydrologic Cycle.

S4.01 Examine minerals and their identification, products of the rock cycle, byproducts of weathering, and the effects of erosion.
S4.02 Relate the Hydrologic Cycle to include groundwater its zones, movement, and composition; surface water systems, deposits, and runoff.
S4.03 Consider the effects of weather and climate on the environment.
S4.04 Examine the composition of seawater; wave, tides, and currents; organisms, environment, and production of food; energy, food and mineral resources of the oceans.

TOPIC S5: Investigate the properties and reactions of matter to include symbols, formulas and nomenclature, chemical equations, gas laws, chemical bonding, acid-base reactions, equilibrium, oxidation-reduction, nuclear chemistry, and organic chemistry.

S5.01 Examine the science of chemistry to include the nature of matter, symbols, formulas and nomenclature, and chemical equations.

S5.02 Identify chemical reactions including precipitation, acids-bases, and reduction-oxidation.
S5.03 Explore the fundamentals of chemical bonding and principles of equilibrium.
S5.04 Relate the behavior of gases.
S5.05 Investigate the structure, reactions, and uses of organic compounds; and investigate nuclear chemistry and radiochemistry.

TOPIC S6: Explore the principles and theories related to motion, mechanics, electricity, magnetism, light energy, thermal energy, wave energy, and nuclear physics.

S6.01 Examine fundamentals of motion of physical bodies and physical dynamics.
S6.02 Explore the concepts and relationships among work, power, and energy.
S6.03 Explore principles, characteristics, and properties of electricity, magnetism, light energy, thermal energy, and wave energy.
S6.04 Identify principles of modern physics related to nuclear physics.

TOPIC S7: Explore the principles of genetic and molecular Biology to include the relationship between traits and patterns of inheritance; population genetics, the structure and function of DNA, and current applications of DNA technology.

S7.01 Examine principles, techniques, and patterns of traits and inheritance in organisms.
S7.02 Apply the concept of population genetics to both microbial and multicellular organism.
S7.03 Identify the structure and function of DNA and the uses of DNA technology in science, industry, and society.

TOPIC S8: Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

S8.01 Apply the components of scientific processes and methods in classroom and laboratory investigations.
S8.02 Observe and practice safe procedures in the classroom and laboratory.
S8.03 Demonstrate proper use and care for scientific equipment.
S8.04 Investigate science careers, and advances in technology.
S8.05 Communicate results of scientific investigations in oral, written, and graphic form.

# APPENDIX B:

# WORKPLACE SKILLS

# APPENDIX B
# WORKPLACE SKILLS FOR THE 21ST CENTURY

WP1 Allocates resources (time, money, materials and facilities, and human resources).

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.

WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.

WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.

WP5 Selects, applies, and maintains/troubleshoots technology.

WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.

# APPENDIX C:

# STUDENT COMPETENCY PROFILE

# STUDENT COMPETENCY PROFILE
# FOR INTRODUCTION TO AGRISCIENCE

Student: _____

This record is intended to serve as a method of noting student achievement of the competencies in each unit. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the course.

In the blank before each competency, place the date on which the student mastered the competency.

## Unit 1: Introduction to Agriscience

_____ 1. Define terms associated with agriculture, science, and agriscience.
_____ 2. Explain major sciences supporting agriscience.
_____ 3. Explain current trends occurring in agriscience.

## Unit 2: Introduction to Agriscience Lab and Safety

_____ 1. Describe the basic rules of safety in the agriscience laboratory.
_____ 2. Identify all safety equipment in the agriscience laboratory.
_____ 3. Practice safety concepts in laboratory activities.

## Unit 3: Introduction to the Scientific Method

_____ 1. Identify the terms associated with the scientific method.
_____ 2. Describe each step of the scientific method.
_____ 3. Apply the scientific method.

## Unit 4: Human Relations/Leadership in Agriscience

_____ 1. Define the terms related to human relations and leadership.
_____ 2. Explain acceptable manners in appropriate places.
_____ 3. Explain traits of a good leader.
_____ 4. Describe the role of FFA in developing leadership.
_____ 5. Participate in parliamentary procedure.
_____ 6. Explain opportunities for leadership development through the FFA.

## Unit 5: Supervised Agricultural Experience (SAE) in Agriscience

_____ 1. Describe the purposes and requirements of the SAE.
_____ 2. Develop a long-range personal plan for the SAE.
_____ 3. Develop a short-range personal plan.

_____ 4. Complete a training agreement for an SAE.
_____ 5. Describe agricultural record keeping for an SAE.
_____ 6. Maintain agricultural records for an SAE.

Unit 6: Basic Agricultural Information Systems

_____ 1. Identify agricultural information systems.
_____ 2. Use computer applications in agriscience.
_____ 3. Communicate using computerized communications.
_____ 4. Access information available through the ASIS.
_____ 5. Access the World Wide Web.

Unit 7: Basic Principles of Animal Science

_____ 1. Identify terms associated with animal science.
_____ 2. Identify major species of economically important animals.
_____ 3. Identify two major products or uses of each species.
_____ 4. Identify the body parts of each species.
_____ 5. Describe the wholesale cuts of each species of meat animal.

Unit 8: Mechanical Technology in Agriscience

_____ 1. Identify terms associated with mechanical technology in agriscience.
_____ 2. Explain the structure of matter.
_____ 3. Explain properties of matter.
_____ 4. Use precision measuring devices to determine mass, weight, and volume.
_____ 5. Identify the physical properties of specific materials.
_____ 6. Identify and calculate mechanical advantages of six simple machines including lever, inclined plane, wheel, fulcrum, pulley, and axle.
_____ 7. Explain the principle of mechanical advantage by using simple machines.
_____ 8. Explain the differences between alternating current (AC) and direct current (DC).
_____ 9. Demonstrate principles of a simple circuit.
_____ 10. Explain the characteristics of insulators and conductors.
_____ 11. Explain the principles of series and parallel circuits.

Unit 9: Principles of Food and Fiber Science

_____ 1. Explain the economic scope of major areas of the food industry.
_____ 2. Explain career opportunities that occur in the food industry.
_____ 3. Explain functions of basic elements of nutrients for humans.
_____ 4. Explain the process for slaughtering animals for food.

_____ 5. Explain methods of processing, preserving, and storing foods.
_____ 6. Describe techniques used in preparing and displaying food for retail sale.

Unit 10: Principles of Plant Science

_____ 1. Identify terms related to plant science.
_____ 2. Identify and explain major plant parts including roots, stems, leaves, and flowers.
_____ 3. Explain the important plant growth and food production processes.
_____ 4. Identify reproductive parts of flowering plants.

Unit 11: Principles of Soil Science

_____ 1. Identify terms related to soil science.
_____ 2. Identify soil components.
_____ 3. Identify the layers of a soil profile.
_____ 4. Evaluate the soil texture components.
_____ 5. Conduct a plant nutrient experiment.
_____ 6. Conduct a basic soil test.

Unit 12: Principles of Entomology

_____ 1. Define terms related to entomology.
_____ 2. Describe the importance of entomology to agriculture.
_____ 3. Describe the parts of an insect.
_____ 4. Explain the growth processes of insects.
_____ 5. Apply an integrated pest management plan in the greenhouse.

Unit 13: Introduction to Biotechnology

_____ 1. Define terms related to biotechnology.
_____ 2. Explain historical events in biotechnology.
_____ 3. Analyze DNA properties.

Unit 14: Opportunities in Agriscience

_____ 1. Explain the opportunities for careers in agriscience.
_____ 2. Identify activities in middle school, high school, and thereafter to help prepare for agriscience careers.
_____ 3. Develop resources to obtain career assistance in agriscience.